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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/681,304      | 03/15/2001  | Richard Joseph Saia  | RD-28435            | 9545             |

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GENERAL ELECTRIC COMPANY  
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EXAMINER

NGUYEN, DILINH P

ART UNIT PAPER NUMBER

2814

DATE MAILED: 02/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/681,304

Applicant(s)

SAIA ET AL.

Examiner

DiLinh Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 05 February 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-8,16 and 19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-8,16 and 19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorowitz et al. (U.S. Pat. 5,757,072) in view of Noddin (U.S. Pat. 5731047) and further in view of Centofante (U.S. Pat. 5833903).

Gorowitz et al. disclose the device (cover fig. and figs. 3a-3d, column 8, lines 20 et seq.) comprising:

an adhesive layer 30 to attach a Kapton polyimide film 32 (column 9, lines 18-24) to a dielectric film 28;

providing a cavity 16r and extending through the Kapton polyimide film 32 and at least partially through the dielectric layer 28;

removing the film 32 (fig. 3b, column 9, lines 18-24);

attaching the semiconductor chip 12 to the dielectric layer 28 with an air bridge structure 12c being positioned within the cavity. Gorowitz et al. disclose the claimed invention except not specifically pointing out the adhesive layer 30 is a partially-cured adhesive.

Noddin discloses a semiconductor device comprising: using a partially-cured adhesive (column 31, lines 10-15) and it is well known in the art to use the partially-

cured adhesive to provide the secure bonding for the device. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Gorowitz et al. as shown by Noddin to provide the secure bonding for the device.

Gorowitz et al. and Noddin fail to disclose the cavity having a smooth surface perimeter.

Centofante discloses a semiconductor device (figs. 2-6 and 2-11) comprising a cavity 24, wherein the cavity having a smooth surface perimeter (column 9, lines 26-40). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Gorowitz et al. and Noddin to reduce the amount of space required on a circuit board and to assure in quality and less complex to implement the package device, as shown by Centofante.

- Regarding claims 2 and 16, Gorowitz et al. disclose providing vias through the dielectric layer (figs. 3c-3d) extending to connection pads of the chip 12 and applying a pattern of electrical conductors to the connection pad (cover fig.).
- Regarding claim 3, Gorowitz et al. disclose using the adhesive to attach the Kapton polyimide film 32 to the package, coating the dielectric layer 28 with the adhesive 30.
- Regarding claim 4, Gorowitz et al. disclose attaching the chip comprises using the adhesive (fig. 3c, column 9, lines 25-37).

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- Regarding claim 6, it would have been conventional to one having ordinary skill in the art wherein the adhesive comprises a mixture of photodielectric and epoxy materials.

3. Claims 7-8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorowitz et al. (U.S. Pat. 5,757,072) in view of Noddin (U.S. Pat. 5,731,047) and further in view of Takeuchi et al. (U.S. Pat. 5,522,006).

Gorowitz et al. and Noddin disclose the claimed invention except for not providing a protective coating in the cavity, and wherein the protective coating comprising a hermetic seal MEMS package flexible layer.

Takeuchi et al. disclose a semiconductor device comprising:

a protective coating 34 in a cavity 31a, and wherein the protective coating comprising a hermetic seal for the package device (fig. 3, column 5, lines 56-60)

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Gorowitz et al. and Noddin to enhance the hermetic tightness of the seal in the cavity for the package device, as shown by Takeuchi et al.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (703) 305-6983. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

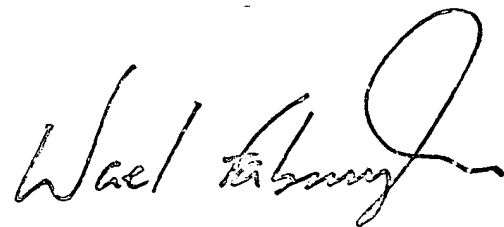
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers

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for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

DLN  
February 9, 2003

A handwritten signature in black ink, appearing to read "Wael Elhany", is written over a faint, circular official stamp.

SUPERVISORY PRIMARY EXAMINER  
TECHNOLOGY CENTER 2800